Measuring Feed Costs and How to Use This Information

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John F. Patience, Prairie Swine Centre Inc., Saskatoon, Saskatchewan

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Introduction

Because feed represents approximately 53% of the total cost of production, and close to two-thirds of the variable costs (Table 1), it attracts a great deal of attention in terms of budgets, etc. Clearly, optimizing - not minimizing - the investment in feed not only keeps costs as low as possible, but results in the most profitable level of production.

Despite the importance placed on feed costs, the effort involved in measuring them is generally very low. Under conventional production systems, where homegrown grains are used on the farm and animal flow through the barn is continuous, it is difficult to get a good handle on total feed costs, let alone costs for different phases of production. However, failure to do so can result in significant losses of potential profit.

For example, the analysis summarized in Table 2 using the PorkPlan Program revealed that simply increasing growout feed conversion from 2.92, which is quite good, to 3.15, which is not that uncommon, increases the breakeven cost of production from $135.91 /ckg to 140.16/ckg. Looked at another way, it increased the dollars available for labour and owner salary on this 250 sow farrow-to-finish unit from $2,859 to $26,981 - an almost 10-fold difference!

Such examples illustrate that the emphasis on feed costs is well-placed; however, actually determining feed costs - and doing something about them - remains a challenge.

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What should be measured?

There is no single measurement which will provide all the information needed to control feed costs. Following are some suggested criteria which can be used by

the owner/manager to make informed decisions regarding feeding programs on his unit.

Feed cost/pig sold, calculated as the total value of feed used divided by the number of pigs produced. This is one of the simplest pieces of information available, and provides a good overview of the total investment in feed. It is calculated by determining the total value of feed used on the farm and dividing by total production. For the herd budgeted in Table 1, total feed cost per pig sold was $70.15.

Example I.
For the period from July 1, 1994 to June 30, 1995, the unit produced 3,293 pigs. During this period, the total feed bill was $231,004, including purchased starters, home grown corn, purchased premix and purchased soybean meal. Thus, the feed cost per pig sold was $70.15. It is assumed that herd inventory did not change during this period.

It is important to note that the number of pigs produced may not be the same as the number of pigs sold, as inventory may be increasing or declining during the period in question. Such changes in inventory can have a major effect on this calculation.

While this number is one of the simpler ones to estimate, it is not a direct evaluation of feed cost, as it is influenced by reproductive performance. Obviously, a higher producing herd can divide the breeding herd feed over more animals, thus lowering the feed cost/pig sold.

Whole herd feed conversion is calculated by dividing the total quantity of feed used by the total gain of all market hogs sold. Because sow feed is included in the estimate, it is also influenced by breeding herd performance. It must also be noted that changes in herd inventory, or changes in the average body weight of pigs in inventory, can affect this calculation. For the example herd described in Table 1, the whole herd feed conversion was 3.01.

Example II.
Using the same herd as in example I, 3,293 pigs were sold during the 12 month period; average sales weights was 107 kg. During this period, the farm used 55 tonnes of purchased starters, 764 tonnes (13,647 bushels) of corn, 201 tonnes of soybean meal and 40 tonnes of premix, for total feed usage of 1,060 tonnes or 1,060,000 kg. Total pig gain during the period was 3,293 X 107 = 352,351 kg. Therefore, the total herd feed conversion was 1,060,000/352,351 = 3.01. It is assumed that herd inventory was constant during the period.

The above estimates provide a broad overview of the herd feed costs. As a benchmark, it serves a useful role in comparing one herd against others. However, if the value is higher than desired, much more information is required to determine where the shortfalls occur. For example, if whole herd feed conversion is too high, it could be due to poor reproductive performance, rather than poor growout performance. For example, in the budgets presented in Table 2, simply reducing sow productivity from 23.8 to 20.0 pigs per sow per year increased whole herd feed conversion from 3.01 to 3.09.

How can we obtain more precise information? One method is to determine the growout feed conversion, separate from the whole herd. This provides more focus on one portion of the production system and allows us to benchmark more precisely. Growout feed conversion is calculated by dividing total feed utilization in growout by the total pig gain in growout for the period in question.

Example III.
Continuing with the same herd as above, total sales remain the same at 3,293. However, pigs enter growout at 23 kg and are marketed at 107 kg, resulting in 84 kg of gain per pig or 84 X 3,293 = 276,612 kg of total gain. During this same

period, the grower barn used 614 tonne of corn (11,000 bushels), 162 tonne of soybean meal and 32 tonne of premix, for total feed usage of 808 tonnes. Thus, growout feed conversion is 808,000/276,612 = 2.92.

If it is not possible to determine how much corn or soybean meal was used in growout as compared to the sow herd, another method may be possible on some farms. Some mills record the total production of each diet. This number can be used to calculate growout feed conversion.

Growout feed cost/pig sold is calculated by dividing the total cost of growout feed by the total number of pigs sold. Again, this number will only be accurate if inventory is constant. It is a more focused number, defining the cost to feed out individual market hogs. The difference between this value and the earlier calculated value is the impact of the breeding herd and the nursery. These two pieces of information - feed cost per pig sold and growout feed cost per pig sold provide a good starting point for keying in on specific components of the feed bill.

Further benefit can be derived by estimating the cost of individual diets within the growout period, or within the breeding herd, or within the nursery. While more difficult to determine, it allows the owner/manager to key in on specific phases of the production system; clearly, this approach will provide the greatest benefit in terms of optimizing feed costs, but is just as clearly requires more effort to obtain.

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Alternate methods

While the inventory method is the simplest approach, it is the least accurate, because it can change dramatically over time as inventory rises and falls. Very few barns operate with a constant inventory; fortunately, a simple review of market hog sales will provide a useful indicator of how much fluctuation occurs. This in turn will define how short a period can be used when applying the above inventory-based methods.

An alternate method is to conduct feeding trials on the farm. This provides direct data on a specific group of animals; it also allows for the determination of feed intake and growth curves, both of which are extremely useful in diet formulation. On the Prairies, we are often able to reduce feed costs by as much as 3 or 4 dollars per pig sold, when we have accurate information on feed intake and feed utilization. Without this information, optimizing feeding programs can be quite difficult.

Feeding trials on small groups of animals also have their limitations. The results obtained in any one group of pigs may not necessarily be representative of the total herd, due to seasonal differences, changes in diet, etc.

The best method, and the one which should be used by all herds serious about controlling feed costs is the direct measurement method. In this case, all pigs are weighed into the room or barn and weighed out. Feed is measured as well, so that both sides of the calculation is quite accurate. Seasonal changes can be determined, along with other fluctuations throughout the year. This method works best with all-in-all-out facilities, but can be made to work in all types of operations.

Nutritionists almost salivate when given this kind of information! It provides such useful information that optimizing feed costs is much easier and less prone to guesswork.

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How do we use the information?

One of the great frustrations of record keeping is that the information is not always put to use! Before the advent of the home computer and associated record keeping systems such as PigChamp, PigTales and EasyCare, manual records filled shoe boxes and any other container because there was no easy way to assimilate all of the data! The developers of these computerized record-keeping systems created a minor revolution in pork production, as their products have given us power - the power of knowledge.

We need to take the same approach to feed information. Information on feed utilization and feed costs can provide invaluable information for the owner/manager, as well as the nutritonist. Following are three uses of such information.

1. Benchmarking: data from one farm can be compared with others to determine its relative performance; is change needed and what level of improvement is likely if such changes are implemented? As an examle, such benchmarking was commonly used on the Prairies to determine whether or not depopulation and repopulation was advisable in a given situation.

2. Management decision-making: with accurate information on feed intake curves, one can make informed decisions on selecting market weights which maximize net income for the total farm, on expanding to a larger unit or specializing in a new growout facility. It can also determine the impact of season on feed utilization and thus establish whether investment in improved summer ventilation or winter heating is warranted. The list of potential management questions is almost inexhaustible. Fundamentally, such information can establish how much money can be invested in achieving change in order to earn a reasonable payback.

3. Diet formulation: The process of designing feeding programs and formulating diets requires assumptions with respect to feed intake and animal growth. When such information is available, nutritionists can be very precise in designing the optimum feeding program. For example, a recent experience allowed for redesigning the growout feeding program on a 2,000 sow unit, resulting in savings of $3 for gilts and $4 for barrows. Total savings? $147,000!

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Final thoughts

Feed is the number one item in the cost of production budget. On many farms, the investment in feed is a quarter of a million dollars or more! Small percentages of improvement are therefore worth many thousands of dollars. The effort required to measure feed intake is often rewarded manyfold, with little downside risk. It is therefore surprising that more information on feed intake and feed costs on individual farms is not collected more routinely. Given the increasing cost of feed and decreasing price of pigs, the motivation to determine feed conversions and feed costs will magnify. The impact will be of interest to us all!

Table 1. "Typical" Cost of production budget

Revenue			
Market hogs	737,345	2,949.38	123.80
Cull sows	12,177	48.71	2.04
Cull boars	540	2.16	.09
Total revenues	750,063	3,000.25	125.93
Expenses - variable			
Feed	417,804	1,671.22	70.15
Replacement stock	40,240	160.96	6.76
Salaries/benefits	35,000	140.00	5.88
Veterinary, etc.	14,890	59.56	2.50
Utilities	20,846	83.38	3.50
Maintenance	16,000	64.00	2.69
Manure disposal	9,410	37.64	1.58
Other expenses	22,000	88.00	3.69
Marketing and transport	22,873	91.49	3.84
Operation interest	25,929	103.71	4.35
Total variable expenses	624,992	2,499.97	104.93
Contribution margin	125,071	500.28	21.00
Expenses - Fixed			
Salary (owner)	25,000	100.00	4.20
Property taxes	1,500	6.00	0.25
Insurance	8,151	32.60	1.37
Depreciation	53,333	213.33	8.95
Interest on LTD	70,143	280.57	11.78
Total fixed expenses	158,127	632.51	26.55
Total Costs	783,119	3,132.48	131.48
Net Income (loss)	(33,056)	(132.22)	(5.55)

Budget model for a 250 sow farrow-to-finish operation with a total investment of $1,169,W (40% equity), selling 5,956 pigs per year, grading 109.5 and with a whole herd feed conversion of 3.01. The market price was selected for the week of November 8,1995 at $130.10/ckg. The following feed prices apply: wheat - $158/tonne; barley $120/tonne; soybean meal - $320/tonne; canola meal - $192 /tonne; premix - $640/tonne. Derived from PorkPlan v 1.0b.

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Table 2. Impact of altered productivity on cost of production budget (November 8,1995)

No. sows	250	250	250	250	250
Annual sales, pigs/sow/yr.	23.8	20.0	23.8	20.0	23.8
Growout feed conversion	2.92	2.92	3.15	3.15	2.92
Revenue					
Market hogs	123.80	123.80	123.80	123.80	123.80
Cull sows	2.04	2.44	2.04	2.44	2.04
Cull boars	0.09	0.11	0.09	0.11	0.09
Total revenues	125.93	126.34	125.93	126.34	125.93
Expenses - variable					
Feed	70.15	72.23	74.03	76.13	66.73
Replacement stock	6.76	8.05	6.76	8.05	6.76
Salaries/benefits	5.88	7.00	5.88	7.00	5.88
Veterinary, etc.	2.50	2.50	2.50	2.50	2.50
Utilities	3.50	3.50	3.50	3.50	3.50
Maintenance	2.69	3.20	2.69	3.20	2.69
Manure disposal	1.58	1.88	1.58	1.88	1.58
Other expenses	3.69	4.40	3.69	4.40	3.69
Marketing and transport	3.84	3.85	3.84	3.85	3.84
Operating interest	4.35	4.62	4.53	4.80	4.20
Total variable expenses	104.93	111.23	108.99	115.31	101.37
Contribution margin	21.00	15.11	16.95	11.03	24.57
Expenses - Fixed					
Salary (owner)	4.20	5.00	4.20	5.00	4.20
Property taxes	0.25	0.30	0.25	0.30	0.25
Insurance	1.37	12.59	1.37	1.59	1.37
Depreciation	8.95	10.67	8.95	10.67	8.95
Interest on LTD	11.78	14.03	11.78	14.03	11.78
Total fixed expenses	26.55	31.58	26.55	31.58	26.55
Total costs	131.48	142.82	135.54	146.89	127.91
Net income (loss)	(5.55)	(16.48)	(9.60)	(20.55)	(1.98)
Breakeven price, $/ckg	135.91	147.30	140.16	151.55	132.18
Labour dollars available	$26,981	($22,400)	$2,859	(42,750)	48,244

Budget model for a 250 sow farrow-to-finish operation with a total investment of $1,169,500 (40% equity), selling 5,956 pigs per year, grading 109.5 and with a whole herd feed conversion of 3.01. The market price was selected for the week of November 8,1995 at $130.10/ckg. The following feed prices apply: wheat - $158/tonne; barley $120/tonne;soybeanmeal-$320/tonne; canola meal-$192/tonne; premix-$640/tonne. Derived from PorkPlan v 1.0b.

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